WHAT IS CLAIMED:

1. A method for biological burden reduction, comprising a step of applying a continuous stream of O_x to a material in a sealed biological burden reduction chamber, wherein said O_x includes oxygen and its radicals.

2. The method of claim 1, wherein O_x is selected from an integer from 1 to 3.

3. The method of claim 1, further comprising continuously withdrawing O_x from said sealed biological burden reduction chamber.

4. The method of claim 1, further comprising creating a pressure differential within said biological burden reduction chamber and maintaining said pressure differential while continuously applying said stream of O_x to said material.

5. The method of claim 4, further comprising agitating said O_x in said biological burden reduction chamber to increase permeation of said O_x into said material.

6. The method of claim 5, wherein forced air is used to agitate said O_x.

7. The method of claim 5, wherein said agitating distributes said O_x evenly throughout said biological burden reduction chamber.

8. The method of claim 5, further comprising

(a) creating a vacuum within said biological burden reduction chamber;

(b) generating O_x in an O_x generation cell;

(c) withdrawing a stream of O_x from said O_x generation cell into said biological burden reduction chamber; and

(d) withdrawing O_x from said biological burden reduction chamber.

9. The method of claim 4, wherein said O_x generation cell comprises an O_x generator capable of generating O_x at a pressure of less than 20 lbs/in^2 selected from one or

more of the group consisting of corona discharge, high frequency electrical discharge, ultraviolet light, x-ray, radioactive isotopes and electron beam.

10. The method of claim 8, wherein said O_x in said biological burden reduction chamber is maintained at a concentration of about 0.1% to about 100% per total volume of gases in said biological burden reduction chamber.

11. The method of claim 10, wherein O_3 in said biological burden reduction chamber is maintained at a concentration of about 0.1% to about 25% per total weight of gases in said biological burden reduction chamber.

12. The method of claim 11, wherein said O_3 in said biological burden reduction chamber is maintained at a concentration of about 3% to about 16% per total weight of gases in said biological burden reduction chamber, wherein an amount of O_3 used is dependent on said material.

13. The method of claim 8, further comprising maintaining a pressure differential between a pressure within said O_x generation chamber and a pressure within said biological burden reduction chamber sufficient to continuously withdraw said O_x through said biological burden reduction chamber.

14. The method of claim 8, further comprising using a biological burden reduction chamber of about 100 $ft.^3$ to about 8000 $ft.^3$.

15. The method of claim 8, further comprising using a biological burden reduction chamber of about 1 $ft.^3$ to about 100 $ft.^3$.

16. The method of claim 13, further comprising controlling water vapor present in said continuous stream of O_x prior to applying said continuous stream of O_x to said material.

17. The method of claim 12, wherein said pressure within said biological burden reduction chamber is maintained between about 0 psia and 20 psia.

18. The method of claim 1, wherein said 0_x is generated from ambient air or components of ambient air.

19. The method of claim 1, wherein said 0_x is generated from other oxygen sources including gaseous oxygen, liquid oxygen, H_20 and mercuric oxide.

20. The method of claim 1, wherein the material is a food product.

21. The method of claim 1, wherein the material is a medical product.

22. The method of claim 1, wherein the material is a cosmetic ingredient.

23. The method of claim 1, wherein the material is a dietary supplement.

24. The method of claim 1, wherein the material is a botanical.

25. The method of claim 1, wherein the material is a nutraceutical.

26. The method of claim 1, wherein the material is a pharmaceutical ingredient.

27. The method of claim 1, wherein the material is a packaging material.

28. The method of claim 1, wherein the material is a nursery stock product.

29. The method of claim 1, wherein the material is a color additive.

30. The method of claim 1, wherein the material is a seed.

31. The method of claim 1, wherein the material is a personal care product.

32. The method of claim 1, wherein the material is an animal feed.

33. The method of claim 1, wherein the material is a flavoring.

34. An apparatus for biological burden reduction, comprising:

(a) a biological burden reduction chamber;

(b) a vacuum pump coupled to said biological burden reduction chamber;

(c) an 0_x generation cell, wherein said 0_x generation cell comprises a means for generating 0_x;

(d) a first control valve coupled to said biological burden reduction chamber and said 0_x generation cell, wherein said first control valve is capable of permitting said 0_x to be withdrawn from said 0_x generation cell into said biological burden reduction chamber; and

(e) a second control valve coupled to said biological burden reduction chamber, wherein said second control valve is capable of withdrawing 0_x contained within said biological burden reduction chamber.

35. The apparatus of claim 34, further comprising a member for creating forced air contained within said biological burden reduction chamber, wherein said forced air distributes said O_x evenly throughout said biological burden reduction chamber.

36. The apparatus of claim 34, further comprising a temperature-regulating means.

37. The apparatus of claim 34, further comprising a means for controlling water vapor coupled to said biological burden reduction chamber.

38. The apparatus of claim 34, further comprising a controller for controlling and monitoring physical parameters within said biological burden reduction chamber.

39. The method of claim 1, wherein said biological burden is selected from a group of living entities including insects, bacteria, viruses, algae, yeasts, molds, nematodes, parasites and weed seed.

40. The apparatus of claim 36, further comprising a means to convert said O_x to O_2 prior to release into atmosphere.

41. The method of claim 17, wherein a humidity of an atmosphere within said biological burden reduction chamber is between about 20% to about 98%.

42. The method of claim 4, wherein a temperature within said biological burden reduction chamber is between about 32°F and about 80°F.

43. The method of claim 1, wherein a flow rate of said continuous stream of O_x within said biological burden reduction chamber is between about 0.1 L/min/ft^3 and about 2 L/min/ft^3.

44. The method of claim 1, further comprising applying a continuous stream of one or more of a gas selected from the group consisting of N_2, CO_2 and Ar in addition to said continuous stream of O_x.

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